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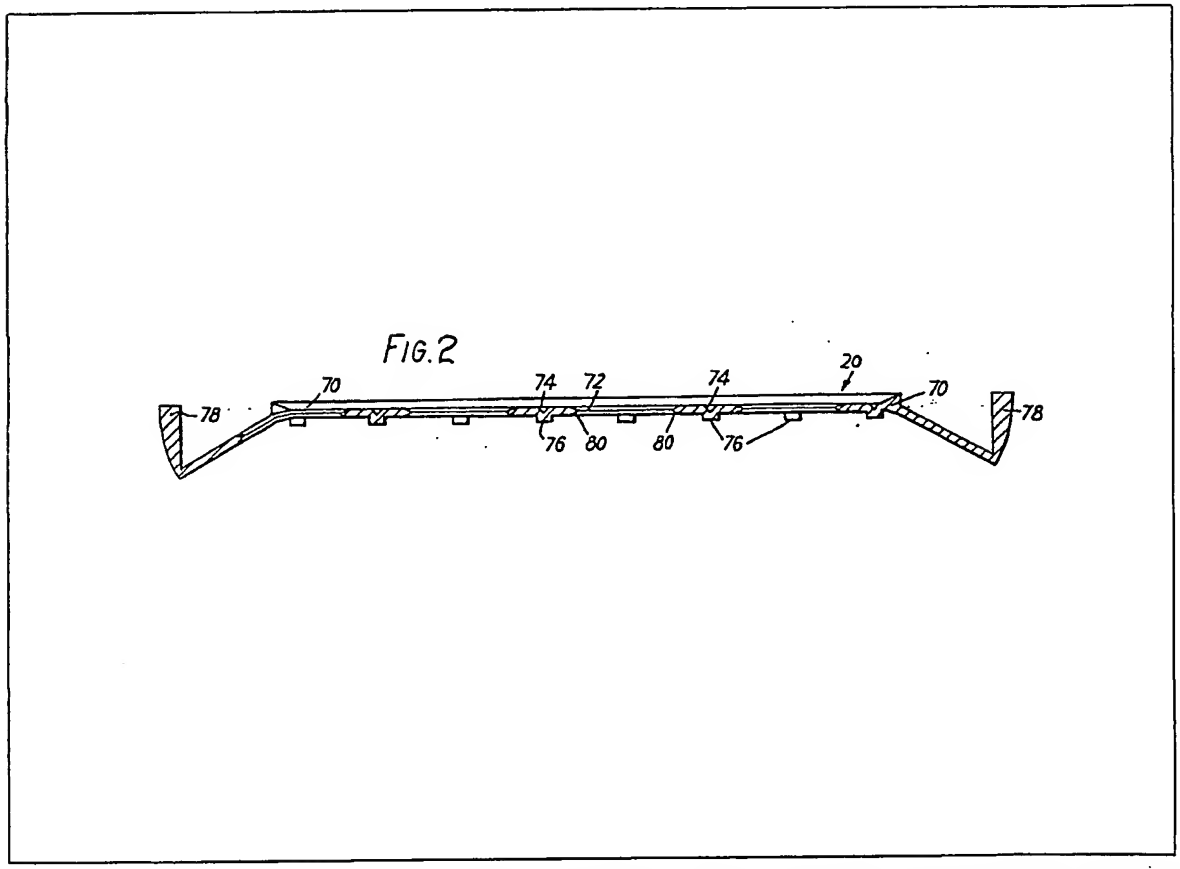
(71) Applicant
Trefolium Marketing Consultants Limited
356 Kennington Road
London SE11 4LD
(72) Inventors
Robin Clover
Ian K Pasco
(74) Agents
Reddie & Grose
16 Theobalds Road
London WC1X 8PL

(54) Illumination for egg setting system

(57) An illuminating overlay (20) for an egg setting tray, comprises a light guide or guides (70) having portions able to receive light from an external source and having individual localised light outlets (76) which are spaced apart in an array to direct such received light locally away from at least one face of the overlay in a corresponding array of individual beams. The overlay suitably consists of an integral moulded sheet (70) of light-transmitting plastics receiving the light through an edge or edges and having indentations (74) in one face which reflect the received light out through the opposite face in an array of individual beams from the respective light outlets (76).



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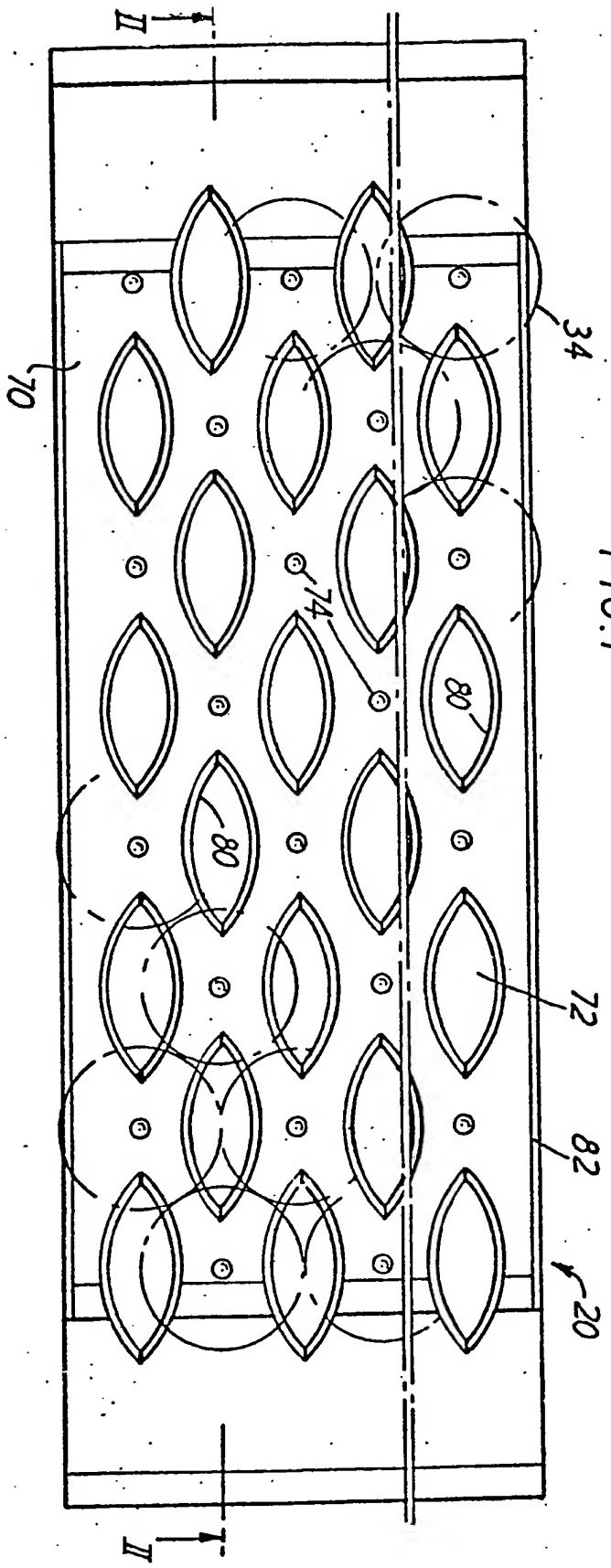

FIG. 1

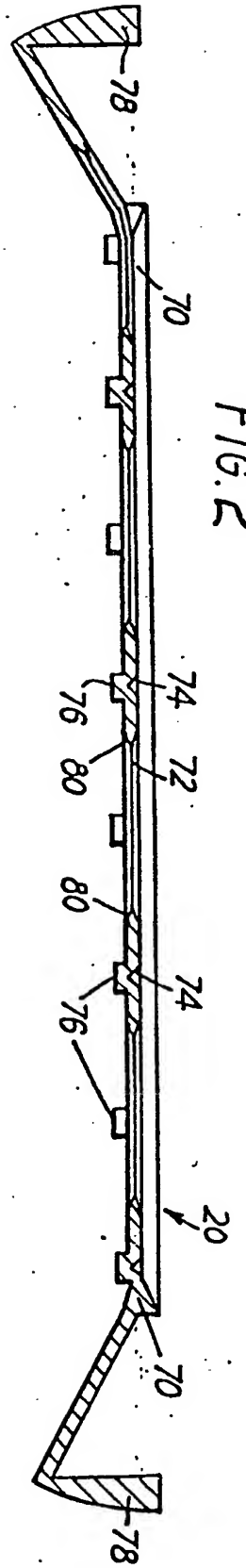

FIG. 2

SPECIFICATION

Illumination for egg setting system

This invention concerns the artificial incubation of eggs. Of particular practical concern is the artificial incubation of chicken eggs, but the invention is equally applicable to the artificial incubation of other hard-shelled eggs.

Such eggs are conventionally incubated artificially on trays each having a surface provided with receptacles (e.g. recesses or holes) to accommodate individual fertilized eggs, the loaded trays being placed and maintained (usually mounted in spaced relationship one above the other) in an environment conducive to incubation of the eggs which they carry.

Illumination of the incubating eggs, and of their air sac ends in particular, can improve early embryonic growth and consequent hatching success and chick life and performance, giving incubation results improved in comparison with those obtained without such illumination.

Heretofore it has not been possible to effect such local illumination of the incubating eggs uniformly and with economic and efficient use of the light.

Application No. 7926512 (Serial No. 2032752A), from which this application is divided, concerns a method of incubating eggs in which the incubating eggs are supported in an array on a tray and are illuminated locally at their air sac ends by an array of individual light beams from an array of localised individual light outlets spaced apart over light guide means receiving light from an external source and constituting at least part of the tray or of a vertically adjacent member or members generally co-extensive with the tray; and egg incubation apparatus comprising egg support means providing receptacles disposed in a first array for holding respective individual eggs in a corresponding array, and light guide means extending adjacent to the first array and disposed to receive light from an external source, the light guide means having individual localised light outlets which are spaced apart in a second array to direct such received light locally towards an end of each receptacle.

In this method and apparatus the local illumination for a tray can be supplied by light guide(s) provided by an additional vertically adjacent illuminating component, an illuminating tray overlay. The present invention relates to the latter system and provides an illuminating overlay for an egg setting tray, the overlay comprising a light guide or guides having portions able to receive light from an external source and having individual localised light outlets which are spaced apart in an array to direct such received light locally away from at least one face of the overlay in a corresponding array of individual beams. The light guides could be supplied as initially separate members for attachment to a pre-formed overlay support, but they preferably form a structural part of the overlay to which they belong, and overlays according to the invention are in fact preferably integrally moulded units of light-transmitting material each consituting a composite light guide.

In one application of the invention, the eggs are carried in conventional manner, air sac upwards, on a number of egg setter trays spaced one above the other in a stack, each tray providing receptacles disposed in an array and holding respective individual eggs in said array, e.g. in a square packing or hexagonal close packing arrangement. The eggs on a tray are illuminated by means of an overlay mounted over the egg setter tray and having light guides with localised light outlets which locally direct light downwards onto the upper ends of the eggs carried on the tray. In this way, wholly conventional existing equipment can be employed, with the addition of the overlays and an appropriate light source therefor. The overlay is conveniently moulded as an integral sheet of light-transmitting material; an array of conical indentations formed in the upper surface of the overlay will reflect light downwards and out through the under surface of the overlay from a corresponding array of localised light outlets disposed in register with the egg receptacles provided by the associated tray below. The overlay is preferably also formed with an array of perforations or relatively large holes therethrough to allow for adequate ventilation. The internal and external edges of the overlay are preferably shaped for maximum internal reflection of light, so as to reduce the dissipation of light from its outer edge and the edges of any ventilation holes. The egg setter trays will normally be employed in a vertical stack, each provided with its own locally illuminating overlay.

The illuminating overlays employed according to the invention may obtain their light from one or more separate external light sources. An external light source, when employed, is preferably in the form of a mobile trolley carrying an upright battery of light sources (e.g. upright or horizontal fluorescent tubes mounted side by side) backed by a reflector or reflectors which may be flat, or of any conic or polygonal section; such a trolley can then be employed to illuminate simultaneously a number of the overlays mounted one above the other in a stack, and can be moved from stack to stack as required. Alternatively each individual overlay may have its own light source or sources, e.g. a fluorescent tube mounted parallel to an edge of the overlay. In either case, the light will preferably be collected for transmission to the overlay by means of at least one lens associated with or integral with the overlay. The or each lens may thus be moulded integrally with the over-

lay, or could for xample be a separate item which clips onto the ov rlay. The overlays may b designed for receipt of illumination along one edg only, or along mor than on edge, e.g. along opposite edges.

An embodiment of the invention will now be described, purely by way of example, with reference to the accompanying drawings, in which:–

Figure 1 is a schematic fragmentary plan view of an illuminating overlay according to the invention; and

Figure 2 is an elevation view, in section along lines II–II of Fig. 1.

Figs. 1 and 2 show an illuminating overlay according to the invention which can usefully be employed in conjunction with conventional non-illuminating egg setter trays. The illustrated overlay 20 is an integral moulding of transparent synthetic plastics material which can be mounted over a conventional tray (not shown) in a conventional stack to illuminate locally the upturned air sac ends of eggs 34 on the tray below. The overlay consists of an integral moulded sheet 70 having an array of holes 72 therethrough to allow for adequate ventilation. The upper surface of the sheet is formed with an array of conical indents 74 whose reflective surfaces direct light passing horizontally through the sheet downwardly through corresponding localised light outlets 76 onto the ends of eggs 34 housed in a tray below, the light outlets being arranged in register with the egg ends. The overlay 20 is moulded integrally with two Fresnel lenses 78 which extend along the full length of respective opposed edges of the overlay. The illustrated overlay is designed for use with an external light source such as that of Figs. 1 to 3 of said U.K. Specification Serial No. 2032752A, but could equally well be provided with means for securing its own light source (e.g. a fluorescent tube) parallel to and along the length of each light receiving edge.

The exposed edges 80 of vents 72, and the exposed external edges 82 of the sheet 70 are shaped to be retroreflective and hence to conserve light within the overlay, reducing its dissipation through these edges.

The invention thus allows for the desirable uniform local illumination of incubating eggs with effecient utilisation of the light supply, and it permits this to be achieved with equipment of standard form, so that application of the invention does not necessitate the expense of the wholesale replacement of existing equipment by new.

For any further understanding that may be necessary of the m thod and circumstances of us of the overlay according to this invention, referenc is directed to said Serial No. 2,032,752.

CLAIMS

1. An illuminating overlay for an egg setting tray, the overlay comprising a light guide or guid s having portions able to r ceiv light fr m an external source and having individual localised light outlets which are spaced apart in an array to direct such received light locally away from at least one face of the overlay in a corresponding array of individual beams.

2. An overlay according to claim 1 comprising an integral moulded unit of light-transmitting material constituting the light guide or guides.

3. An overlay according to claim 2 with at least one edge which has a light-collecting lens integral therewith and extending thereabong for directing light to light receiving portions of the overlay.

4. An overlay according to any preceding claim having an array of indentations in the upper surface thereof to reflect said received light downwards and out through the under surface of the overlay from a said array of localised light outlets registrable in use with egg receptacles provided by an associated egg setter tray below.

5. An overlay according to any preceding claim having ventilation apertures therethrough.

6. An overlay according to any preceding claim whose internal and/or external edges are shaped to inhibit dissipation of said received light therethrough.

7. An overlay substantially as hereinbefore described with reference to Figs. 1 and 2 of the accompanying drawing.

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